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The Copperbelt of Northern Rhodesia

R. W. STEEL

THE COPPERBELT OF NORTHERN RHODESIA covers an area of about 1,600 square miles on the Congo–Zambezi watershed, immediately adjacent to the boundary of the Belgian Congo and to the mining area of Katanga province (Fig. 1). It is, therefore, only a relatively small district in the heart of the immense area of Central Africa: yet for geographers it has a particular interest since it is now second only to the U.S.A. among the world's copper producers, being responsible for more than 15 per cent of the total output, and also because it has certain special problems of transport resulting from its isolated position in the centre of a great continent. It has, moreover, been developed only very recently and is still very much in the stage of being opened up. It is a new, striking and rapidly evolving landscape, with fresh signs of human interference with natural conditions to be seen on all sides.

Ancient workings of copper were found at Kansanshi in 1899 and later at Bwana Mkubwa and Luanshya, but there could be no commercial exploitation until a railway had been built. This came from the south, following the construction in 1903 of the railway bridge across the Zambezi, just below the Victoria Falls. The line was continued northward, past the site of the present capital of Northern Rhodesia, Lusaka, to Broken Hill, where the lead, zinc and vanadium mine was opened in 1906. In 1909 the line reached the Belgian Congo border, by which time mineral developments had started in Katanga, where copper oxides occurred near the surface and were of richer copper content than those of Northern Rhodesia. Copper was worked intermittently at Bwana Mkubwa, but little other development took place in Northern Rhodesia. As recently as 1924 the whole territory produced less than £400,000 of exportable commodities, of which copper accounted for only a very small part.

The situation was completely changed by the discovery in 1925 of sulphide ores with between 3 and 5 per cent of copper at a depth of about 100 feet. Such ores when worked by the flotation process are very valuable, whereas oxide ores of similar grade are of relatively small value. The field proved ideally suited for rapid and large-scale development because, once the geology of the area was understood, great masses of ore could be proved by a relatively small number of drill-holes. So the scepticism of 1926 and even of 1928 (when the area was still ignored by the principal members of the International

➢ Professor Steel is John Rankin Professor of Geography in the University of Liverpool. His paper was read to Section E of the British Association for the Advancement of Science at its meeting at Sheffield on 31st August, 1956.

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Copper Cartel) was replaced by the optimism of 1930, when it was established that there were reserves of over 500 million tons of ore containing more than 20 million tons of copper.

Within a few months the area now known as the Copperbelt was in the middle of a construction boom, and Ndola was talked of as a second Johannesburg. Europeans entered the area in considerable numbers, and an African labour force of 30,000 was employed. This prosperity was short-lived, however, for the world economic depression quickly hit Central Africa: the price of copper fell from £72 a ton in 1930 to only £27 in 1931. Development and building had everywhere to be suspended, and only two of the new mines remained open. The number of Africans employed fell to 6,000, and many Europeans had to be dismissed and left the country.

During the 'thirties the situation gradually improved. Exports of blister copper rose from 3,000 tons in 1931 to 103,000 tons in 1933, and after 1935 electrolytic copper was also produced, so that the combined export of 1938 totalled 220,000 tons. Production was maintained and increased during the Second World War, despite temporary, but at the time very acute, problems of European manpower and African labour, and notwithstanding the grave shortage of railway rolling-stock, the congestion in the ports, particularly Beira in Portuguese Mozambique, and the difficulties and dangers of the high seas. Peak war-time production of 266,000 tons was reached in 1943, when 35,000 Africans were employed at the mines.

These war-time increases in output were but small, however, compared with what has happened during the last ten years. The rise in production has been steady from 175,000 tons in 1945 to the post-war record output of 424,000 tons in 1954; while, because of the greatly increased price of copper in recent years, the value in 1954 was nearly ten times the figure for 1945. Even more valuable was the smaller production of 1955—the result of a prolonged strike early in the year—when the total output of 383,000 tons was worth nearly twelve times that of 1945. Blister copper production has remained fairly stationary in recent years, the increase being largely accounted for by the growth in the output of electrolytic copper: this trend will become even more marked when the new electrolytic copper refinery at Ndola is completed in 1958, when it will handle 55,000 tons of copper each year with double that amount from 1960.

The Copperbelt occupies a part of the great African plateau lying more than 4,000 feet above sea-level and broken in places by remnants of higher surfaces. The all-important Lower Bwana outcrop, in which the ore occurs, is only narrow and follows a sinuous course across the area, now marked by the various mines. Until the development of the mines the whole district was covered by the dominant ecological type of Central Africa—the *Brachystegia-Isoberlinia* complex which, with amazingly little variation, extends from the

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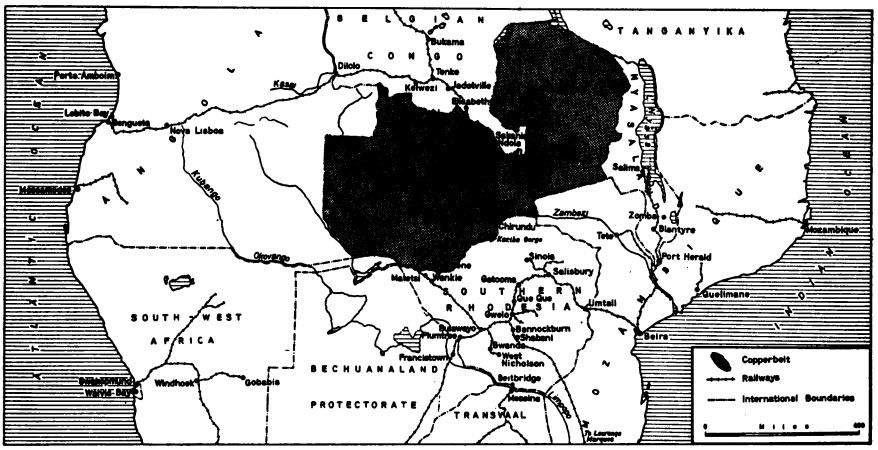

Fig. 1.—The Copperbelt and Northern Rhodesia in relation to other parts of central and southern Africa.

Limpopo right up through the Rhodesias into East Africa. Much of this vegetation type remains: mine buildings, houses and lines of communication have made little impression on it. As recently as 1934 the average density of population for the Ndola District, in which the Copperbelt lies, was only 2·7 to the square mile. Yet to-day this area includes half of all the Europeans in Northern Rhodesia, nearly one-eighth of the total African population, and five of the eight townships of Northern Rhodesia which can properly be regarded as being "urban communities." In thirty years, in fact, an urban and industrialized landscape has been created to replace an almost wholly natural environment in which there was only a very small and exclusively rural and indigenous population. Right in the heart of the African bush are the signs and symbols of twentieth century industrialism alongside the crudest and most primitive of villages.

The four principal mining centres are all served by branches of the railway that closely follows the international boundary, usually just on the Belgian side, from Ndola to Elisabethville (Fig. 2). Ndola, the administrative, and, to some extent, commercial and distributing centre of the Copperbelt, lies a little north of the now abandoned mining township of Bwana Mkubwa. From it railways lead to the mines, two of which belong to the Rhodesian Selection Trust, Limited (R.S.T.) and two to the Anglo American Corporation of South Africa, Limited. The R.S.T. mines are Roan Antelope, 24 miles southwest of Ndola, and adjacent to the Government township of Luanshya, and Mufulira, 48 miles northwest of Ndola. The largest Anglo American mine is Nkana, with the township of Kitwe alongside: the twin-settlement of Nkana-Kitwe with 80,000 inhabitants, including nearly 10,000 Europeans, is easily the largest town in Northern Rhodesia. The Anglo American Corporation also works the Nchanga mine, near

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which is the township of Chingola. Ten miles west of Nkana is Chibuluma where R.S.T. have recently started operations and hope, within a year or two, to have an annual production of 16,000 tons of copper. Anglo American are actively opening up Bancroft (named after J. Austen Bancroft, formerly Consulting Geologist to the British South Africa Company) about 15 miles north of Nchanga, from which the railway has recently been extended through the bush. There are also prospects of developments further to the west, well away from the present Copperbelt, in the Kansanshi–Solwezi area.

The populations of these towns are summarized in Table I, giving the total and European numbers for census and other years for which reasonably reliable statistics are available. In 1931 the townships were so new that there is no record of their African populations; when

Table I

THE COPPERBELT TOWNS: TOTAL AND EUROPEAN POPULATIONS, 1931–56

(Totals, where available, are in italics; all other figures are European totals)

	1931	1939	1946	1949	1951	1953	1956
Nkana–Kitwe	1,762	*20,800* 2,453	2,951	*51,500* 4,067	*53,525* 5,225	*72,200* 7,200	9,700
Luanshaya–Roan Antelope	1,855	*24,000* 2,167	2,741	*46,700* 3,200	*51,176* 4,676	*59,600* 5,600	6,000
Mufulira	722	*18,300* 1,464	2,147	*27,900* 2,146	*39,903* 3,703	*49,700* 4,700	5,600
Nchanga–Chingola	636	*6,300* 300	1,163	*20,100* 1,087	*21,802* 2,602	*28,400* 3,400	4,600
Ndola	1,406	*c. 18,000* 1,247	1,242	*26,200* 2,000	*27,607* 2,907	*39,500* 4,500	6,800
Bancroft							1,800
Totals		*c. 87,400*		*172,400*	*194,013*	*249,400*	
Totals (European)	6,381	7,631	10,244	12,500	19,113	25,400	34,500

the depression struck the Copperbelt there were just over 6,000 Europeans: this figure had doubled by 1949, trebled by 1951, and, according to recently issued figures of the 1956 census, is now increased by about 550 per cent. Bancroft appeared for the first time in 1956 with 1,800 Europeans even before the mine went into production. While these large and prosperous European communities have been developing, the number of Africans employed has grown rapidly and an ever-increasing number of dependants and of Africans employed in ancillary industries and service occupations has also settled in the area. Whereas in 1931 there were, probably, barely 20,000 Africans in the Copperbelt towns, there were possibly 80,000 by 1939, and well over a quarter of a million at the present time. Apart from the Rand

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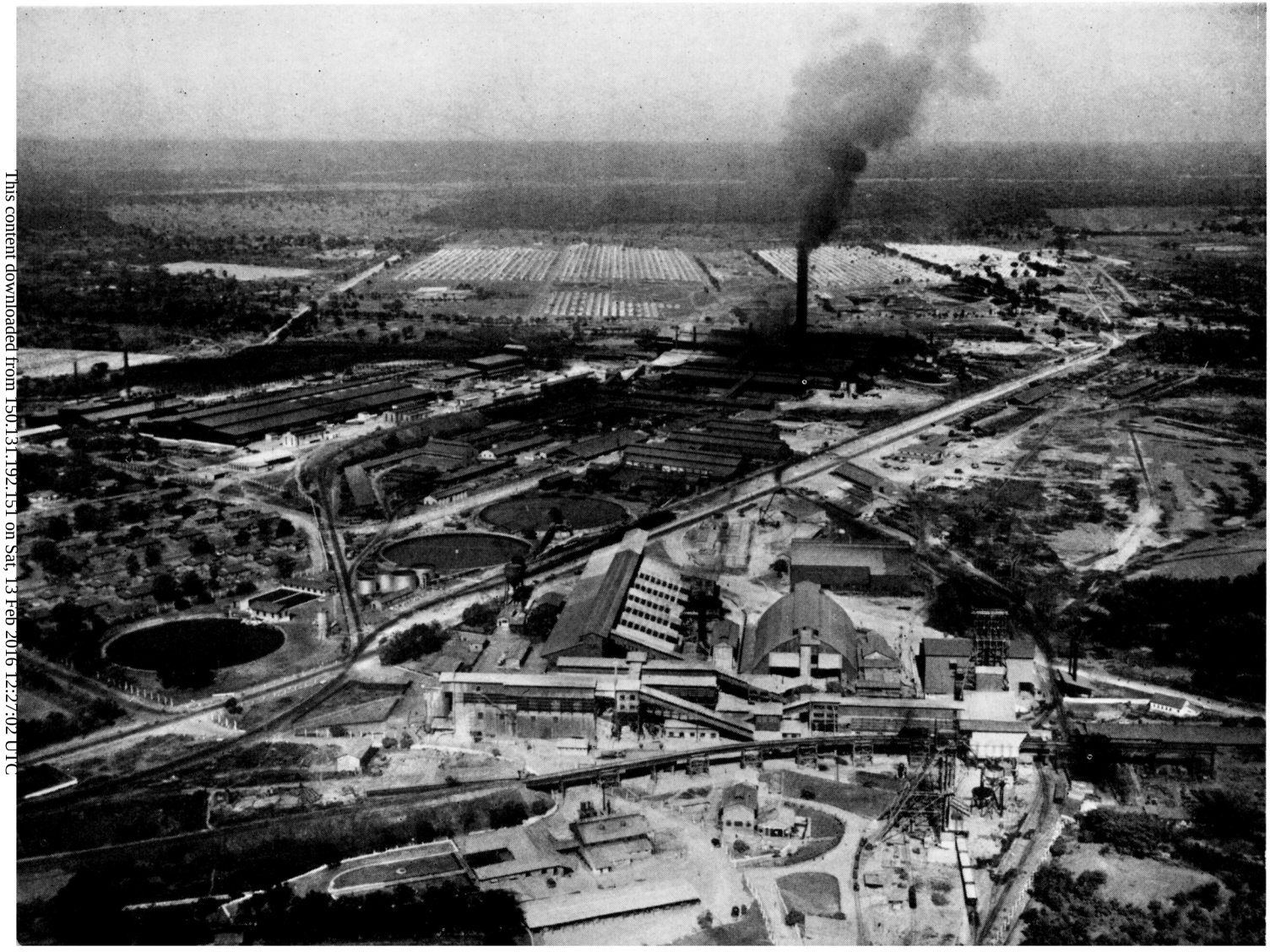

Plate I. An aerial view of Nkana. In the centre background is the high stack of the smelter, with the mine workshop and stores area immediately in front. The refinery is to the left, and slightly forward, of the smelter. Two shaftheads are in the right foreground. There is a portion of the European township of Nkana on the left behind the thickener tank. In the background beyond the smelter is the Wusikili African township. This photograph should be compared with Fig. 3. *All plates are reproduced by courtesy of the Anglo American Corporation of South Africa, Limited.*

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Plate II. Part of Nkana township with some of the mine surface plant in the background. In the foreground are houses and flats for the Company's European employees. The Rhokana Club buildings are to the left of the water tower, with its playing fields in the right foreground.

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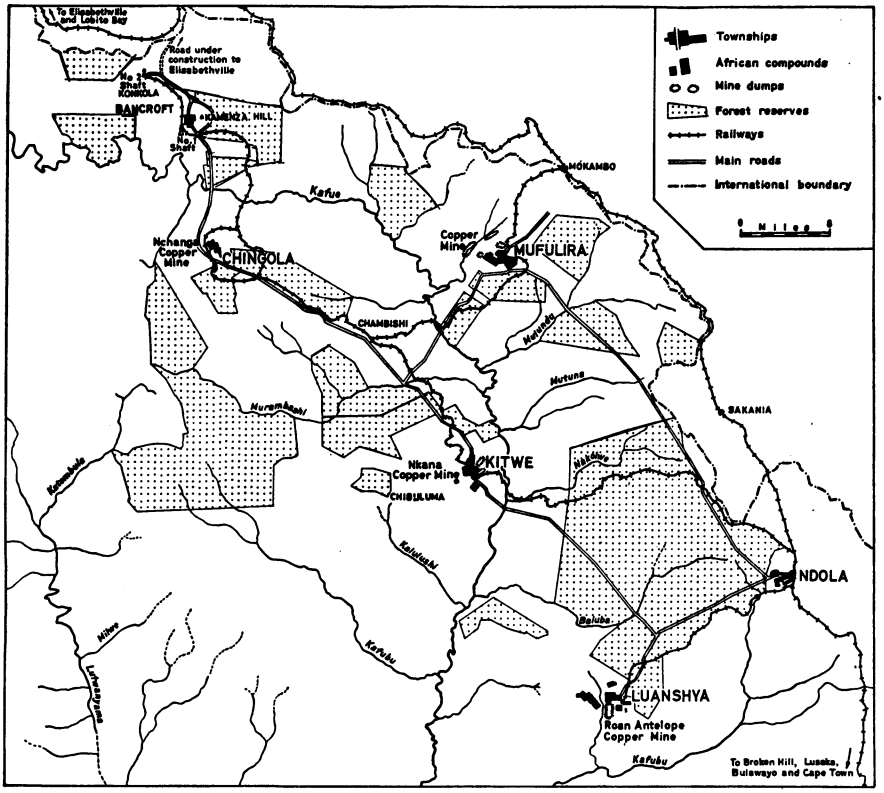

Fig. 2.—The Copperbelt, showing the principal mines, communications and forest reserves.

conurbation in the Union of South Africa there is no comparable concentration of population anywhere in the interior of Southern Africa.

The nature of this concentration of population and of its resultant problems can best be seen by reference to specific cases, those of Nkana-Kitwe, the largest, and Bancroft, the youngest, of the Copperbelt mining communities. Fig. 3, based with permission upon a part of the Directorate of Colonial Surveys 1/50,000 series of Northern Rhodesian maps, and Plates I and II give an impression of the amount of building and the concentration of activity within a limited area—all in the heart of a district that until yesterday was extremely remote, scarcely inhabited and very backward.

Compared with conditions in many African mining areas, including those in the Union of South Africa, individual houses are reasonable as regards construction, size and facilities, though the planning of the African townships such as Wusikili at Nkana is perhaps somewhat unimaginative. Much has been done to provide community services, to which the African from the bush has hitherto been unaccustomed. The shops, offices, cinemas, garages and other central buildings in Kitwe (Plate III) are superior to those found in any other Central

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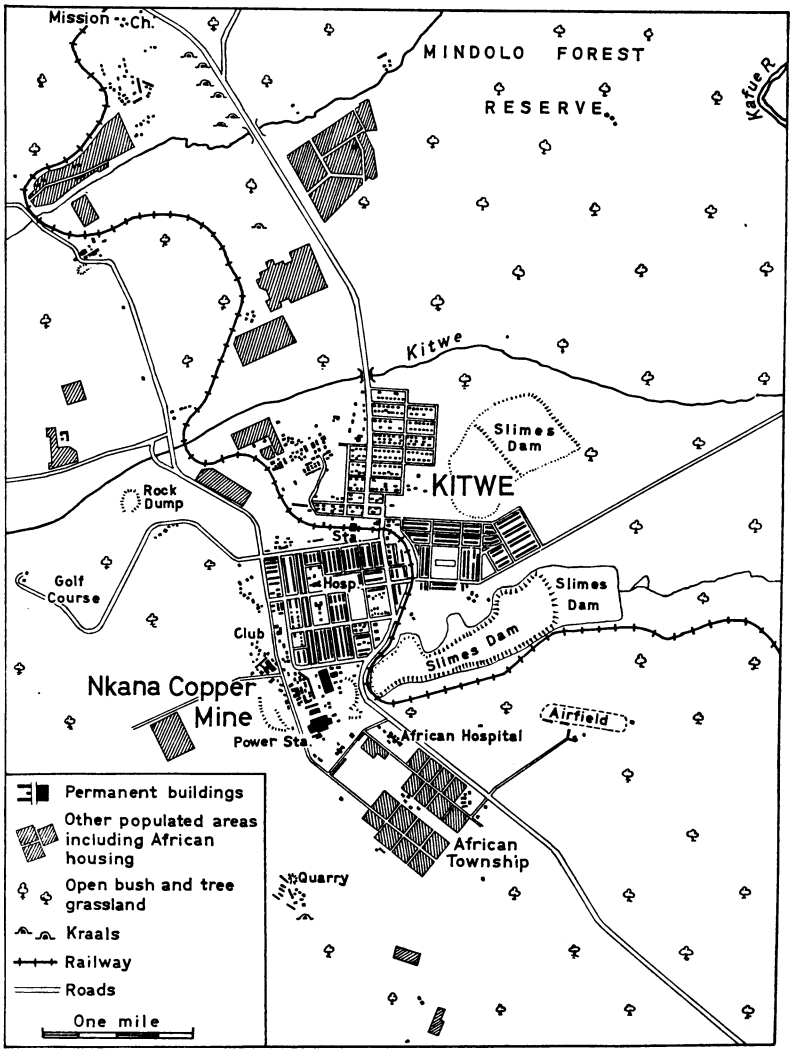

Fig. 3.—Nkana-Kitwe. Map based on the 1/50,000 map of Northern Rhodesia, sheet 1228 SW 3, published by the Directorate of Colonial Surveys, and reproduced with the permission of H.M. Stationery Office. Crown Copyright.

African town, except Salisbury and Bulawayo. In short, everything possible is being done, for both European and African communities, to encourage settlement and to prevent the developments in the Copperbelt from seeming to be only ephemeral. Nevertheless, one need not be a particularly shrewd observer to recognize, beneath the bustle and enthusiasm of Kitwe to-day, plenty of doubts and uncertainties on the part of the government, the mine management and the men, and shared by European and African alike.

Bancroft is of interest because it is the newest and, potentially, the most integrated of all the Copperbelt towns. Government and mine have worked closely together, in the light of experience gained in the

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past elsewhere in the Copperbelt, to produce a co-ordinated plan for both Government and Mining townships, in the centre of which will stand Kamenza hill, surrounded by a natural park. Far more trees are being left in the African township than has been the case in the older centres such as Nkana-Kitwe; and in the African shopping districts branches of flourishing departmental stores in Kitwe set new standards in architectural design and lay-out and in the services that are offered to the community. Development is taking place so rapidly that it is hard to visualize the Bancroft of the future (see Plate V). A few months ago the railway was still under construction, and the bridge over the Kafue river was far from complete: now the railway is open and the mine went into production at the beginning of 1957. The immediate annual production is likely to be between 43,000 and 48,000 tons, but already it is hoped to reach a figure of about 85,000 tons by 1960.

But however careful the planning, however forward-looking the organization, however close the co-operation between Government and Mining Company—and for that matter, whatever the degree of partnership between European and African—developments of this nature and scale are bound to create problems of various sorts, and of these the Copperbelt has good measure indeed. Undoubtedly the advantages of such developments are numerous—among them, the stimulation of general activity resulting from economic prosperity, the value of high living-standards for European immigrants and of regular wage-earning for African workers, and the considerable range of services and amenities that can be offered to the community, both European and African, because of the revenues derived from mining. Recognition of these assets must not, however, blind us to the existence of a debit side, and some mention must be made of the Copperbelt's special difficulties.

On the social side, it must be admitted that the contact of a very diverse European population with large numbers of mixed and, generally speaking, fairly backward Africans is creating problems towards the solution of which very little has so far been achieved. Large numbers of the white miners are Afrikaners from the Union of South Africa, whence they derive their views on politics, on industrial and race relations, and on the place of the African in industry. Most of the Africans are, like the Europeans, immigrants to the area, a district that is agriculturally hard and unprofitable, so that there are relatively few forms of occupation and employment apart from the copper-mining industry. There is, therefore, a whole set of problems commonly referred to as "detribalization," "the stabilization of labour," and "the urbanization of the African": behind these ugly terms are hidden a complex series of difficulties concerned not only with the African population as a whole but with thousands of individual Africans, who find themselves rather bewildered and confused by their first close and rather harsh contact with the industrialism of a new age and of the western world.

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There are two outstanding and interrelated economic problems: the supply of power, and the provision of communications. Power has come mainly from the Wankie coalfield of Southern Rhodesia where there are vast reserves of high quality coal, usually within 80 to 200 feet of the surface. But supplies have often been short in recent years on the Copperbelt, partly because of inadequate production at Wankie and partly owing to shortage of trucks and the general congestion of the single line of Rhodesia Railways that joins Wankie to Ndola. In 1953 Anglo American acquired a controlling interest in Wankie, and since then the situation has improved considerably. When coal supplies fail, the mines turn to the local sources of timber (Fig. 2 shows the extent of the Copperbelt's forest reserves), but wood is becoming increasingly expensive and the supply is by no means inexhaustible. Arrangements have now been made to import electricity from the Belgian Congo during the next six years, and great importance is attached to the Federation's own plans for the generation of hydro-electricity. Two projects have been carefully examined, one at the Kariba gorge of the Zambezi, and the other on the Zambezi's tributary, the Kafue, probably at a dam site a few miles below the township of Kafue, about 220 miles from Nkana in a straight line.* Work at Kariba has already started. Its electricity will be much in demand in the Rhodesian "Midlands," as the Salisbury–Gatooma–Que Que–Gwelo–Bulawayo industrial area is called, but major consumers will also be the copper mines. They have already loaned £20 millions to enable the scheme to go forward, at the same time agreeing to pay a surcharge on Kariba power used between 1961 and 1967 to yield a further £10 millions. For the moment work is concentrated at Kariba, and the plans for Kafue have been shelved. But the fact that two major hydro-electric schemes have been considered for the area is some indication of the scale and intensity of the mining and industrial development in the Federation, and especially in the Copperbelt.

The problem of the adequacy of communications has already been mentioned as a partial cause of the difficulties of power supply; but even more serious is the problem of the export of copper. The ore must, of necessity, be refined as near to the mines as possible: but even then a vast quantity of copper (424,000 tons in the record year of 1954) has to be railed, mostly by the long, circuitous, single-tracked, and badly congested line from Ndola to Lusaka, Livingstone, Wankie, Bulawayo, Salisbury, Umtali and the Portuguese port of Beira in Mozambique, a distance of 1,450 miles. It is tempting to look at a map such as Fig. 1, and to see several alternative and better routes. The Benguela railway to Lobito Bay, for example, is only about 1,300 miles long, but long-established agreements guarantee much of the export to Beira where, in any case, there are special ore-loading facilities: diversion to Lobito would also disturb the existing links

* See the note in *Geography*, vol. xl, 1955, pp. 274–6.

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between the Wankie coalfield and the Copperbelt.* Other routes to Atlantic ports have been considered: a line from Matetsi into South West Africa has been discussed, and one from Plumtree in Southern Rhodesia across the northern part of the Bechuanaland Protectorate to connect with Gobabis and so with Walvis Bay has been partially surveyed. Even much more modest schemes have been found to present unexpected, and sometimes insuperable, difficulties. The linking-up, for example, of West Nicholson with Messina, the northernmost station in the Union of South Africa, would call for the complete reconstruction and re-alignment of the existing Bulawayo–West Nicholson line. The joining of Kafue in Northern Rhodesia and Sinoia in Southern Rhodesia is often referred to as if it were an inevitable corollary to the building of the Kariba dam. Certainly on the map it seems an obvious line, but it appears that the engineering works required to carry such a line across the Zambezi valley and up its very steep northern slopes would be so costly as to make construction most unlikely. Even the Kariba dam is being built not by the laying of a temporary railway but by the building of an approach road from Lusaka and the nearby Chilanga cement works to the dam-site.

A recent provision is an additional line from the Federation at Bannockburn (Southern Rhodesia) to another port in Mozambique, Lourenço Marques, by way of Guija. The line, opened during 1955, does not directly deal with much, if any, Copperbelt traffic; it is hoped, however, that it will help greatly in the reorganization of Rhodesia Railways' traffic so as to ease congestion on the Bulawayo–Salisbury–Beira line and reduce shipping delays at Beira. There are also plans for the centralized control of signalling throughout the Rhodesias as an alternative to the double-tracking of some of the railways which would not, it seems, be an economic proposition.

These various difficulties are examples of the problems that must be faced when an isolated, inland, and hitherto undeveloped area such as the Copperbelt is suddenly touched by the effects of industry and commerce; and the projected further expansion of the Copperbelt, with the coming of Bancroft and Chibuluma into production, may not be attained without very serious attention being given to them.†

Finally, brief mention must be made of the political problems to which these great economic developments give rise. Because the Copperbelt's railways lead to Portuguese ports on both Indian and Atlantic Oceans, and also depend on a long section in Belgian territory,

* Copper has recently been railed to Lobito Bay under an agreement signed early this year by the Federal, Belgian and Portuguese Governments. The agreement lays down maximum tonnages of copper that may be railed through Lobito and stipulates that a through rail rate from Northern Rhodesia, equivalent to the rail rate to Beira, will be granted.

† An article about transport in the Copperbelt is published on pp. 93–5 of this issue.

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from Sakania through Tenke to Dilolo, the Federation must rely very greatly upon the goodwill of its non-British neighbours. The railway and port facilities available in both Angola and Mozambique are largely due to British enterprise, the investment of British capital, and sometimes, perhaps, a certain amount of diplomatic British pressure. The proximity of the Rhodesian Copperbelt and Belgian Katanga raises a further set of problems since they are administered under two such very different systems with widely contrasting objectives: these are based on political philosophies with strikingly divergent views on fundamental matters such as that of African advancement in the mining industry and of the land rights of the indigenous African. Complications also result from the juxtaposition of the Federation with the Union of South Africa—in, for example, the working out of "partnership" in the one and *apartheid* in the other. The meaning of these policies takes on a special significance in the Copperbelt with its growing Afrikaner population and its steadily increasing African (as well as European) urban and industrial population, and with the close ties that exist between the strong European Mineworkers' Union in the Copperbelt and the European Unions at the mines of the Witwatersrand. However isolated the Copperbelt may seem on the map, it is right in the centre of some of the great issues that are causing concern in Central and South Africa at the present time. The tensions that in recent years have so often shown themselves at the mines, in the form of disturbances, riots and strikes, are symptoms of the general unrest in Africa to-day, wherever there has been very sudden economic, social or political advance.

The Copperbelt of Northern Rhodesia is one of Africa's very prosperous spots at the moment, but it is also very much one of its problem areas, and it would be wrong to view its wealth and at the same time to ignore its dangers. It is a part of Africa that has been transformed overnight and whose productivity forms the basis of much of the Federation's prosperity to-day. In a matter of twenty or thirty years the cultural landscape has been entirely transformed, while the area surrounding the Copperbelt, and the lives of the people living there, have so far been changed but little. Prosperous and growing towns have been created where not so long ago there were only a few primitive settlements. Refineries, cooling towers, power lines, modern blocks of buildings, and the whole paraphernalia of the urban and industrial life of the twentieth century now dominate what until yesterday was just another, and a rather undistinguished, piece of African bush. Such an economic revolution raises a host of sociological, political and cultural, as well as geographical, problems. On the success or failure of the tackling of these problems will depend the future progress and prosperity not only of the Copperbelt and of Northern Rhodesia, but of the whole venture of the Federation of Rhodesia and Nyasaland.

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